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Knowledge of diseases and animal control methods at the Grand Kanem in Chad

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ABSTRACT:

The purpose of this study at first was to know the level of knowledge of farmers on recurrent diseases in Grand Kanem and ways to fight against them; and secondly to provide NGOs and policy makers with ways to improve the animal health situation of animals in this region. Two team of experts were formed to cover the area of study in 10 days. Operating income for the livestock system is concerned mainly in the study. Sheets serving as guides for interviews focused on the following points: the most common diseases, the disease name in the vernacular, the periods of their appearance, the manifestation of these diseases, the major difficulties to fight against these diseases and so on. The individual interviews with farmers and groups (focus) helped to know the level of knowledge of recurrent diseases in the region. The description of the manifestation of certain diseases, their time of onset and the socioeconomic consequences show familiarity among breeders with these conditions. Although most farmers are aware of the products that can protect their flock, non-mastery of preventive practices is a serious handicap for the development of this segment of the population in Chad. Viral, bacterial and parasitic diseases remain a major challenge for the health of animals in the area. Pastoralism is the best organized farming system of the area which seems to be one of the factors favoring the emergence of diseases. Access to services, products and the lack of respondent breeders are also factors favoring the emergence of disease. Risk factors are not known by breeders, technical care and treatment are also not mastered by them. Preventive measures associated with these diseases are poorly understood. Awareness and training programs should be done for breeders in order to improve appropriate techniques and practices in the conduct of improving healthy livestock, through vaccination of livestock breeders and structures are contributing to improve the quality of animal health in the area.

Keywords:

Diseases, Factors favoring, Prevention, Health status, Breeders, Grand Kanem, Chad.

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INTRODUCTION

Since 90s, a period of privatization in Chad, certain animal diseases are increasingly recurrent and prevalent in the area. According to the Direction of Veterinary Services, telluric diseases (anthrax, blackleg and pasteurellosis), pleuropneumonia (CBPP) and other viral bacterial and parasitic origins of diseases are more recurrent in Chad. However, the health protection of livestock is a concern for both administrative authorities and farmers. The withdrawal of the state, not perceptible presence of private, inadequate immunization coverage in the country, the lack of knowledge of predisposing factors onset and propagation, not mastery of technical care and treatment animals are the problems that seem to be the cause for the recurrence of diseases. In order to propose ways of improving the health, a study was conducted in the Grand Kanem region by the NGO Action Against Hunger (ACF-France). This region is the trait of union between desert and Sudanian zone that imposes husbandry practices. These practices and traditional breeding techniques handed down from generation to generation seem to be well mastered. Transhumance is one of the best mastered practices known to be found among them. However, difficulties observed in the sanitary practices of this area make the work of NGOs ineffective. Hence, objective of this study is to know the level of knowledge of diseases by farmers to better understand the ways of prevention and fight against them.

MATERIALS AND METHODS

Study Area

It corresponds to the area of intervention of the ACF. This is a set of three administrative regions: Lake (Lake area and the islands), Kanem (North Kanem, Northern Nokou) and Bahr El Ghazal (Soulia). They form what is called the Grand Kanem; farmers spend there in the rainy season-an attachment area for ranchers. These three regions are added to Chari-Baguirmi and Hadjer-Lamis which are reception areas for farmers from Grand Kanem during the dry season. Two teams of five persons each have been established to cover the area in ten days. The first team traveled across Northern Kanem and Lake Chad, and the other team travelled across the Bahr El Gazal and Hadjer-Lamis. The routes for both the teams were by formulated technicians of the ACF with more or less flexibility due to difficulties encountered in the field such as dispersion breeders and difficulty of the movement. In total 11 villages and 24 wells and ferrick were surveyed by both these teams.

Investigations

Three investigative tools have been implemented in the field viz: the Focus Group, individual surveys and observations**.** Various contexts which were faced, have led to the flexibility in implementing these two methods. When meeting with the farmers were held at the well or in a place where there was a ceremony, the Focus Group has been consistently favored over individual interviews.

It is arrived é in some villages visited féricks the number of farmers present was insufficient to hold a Focus Group, in these cases, we conducted individual interviews.

The survey, conducted in the form of focus and individual interviews focused among others on the following points: farming practices, the most common illnesses, the disease name in the vernacular, the periods of their occurrence, manifestation of these diseases, the major difficulties to fight against these diseases, etc.

Direct Observation

In this study we watched some sick animals that have been presented. But different case did not justify a levy to be made.

The results were discussed with representatives of the local veterinary authorities and with representatives of the ACF to ensure knowledge of these diseases by farmers. Direction of Veterinary Services

which has a data bank collected over several decades was accessed, in order to reconcile the information collected and those it holds. The analysis focused on the definition of this concept to prioritization of common diseases by species and sites, the timing and frequency of their occurrence, the manifestation of the disease, risk factors (endemic diseases), the current health system in the country and the need for producers to participate in the prevention of diseases.

RESULTS AND DISCUSSION

Animal Diseases

The diagnosis of pathologies in Grand Kanem is based solely on clinical and epidemiological data. While considering the results, obtained by certain medical evaluation in the study and symptomatic treatment observed in farmers field, we would like to use terms to describe suspicion results. Ticks are not diseases, but cause diseases; in some places especially in northern Kanem farmers consider ticks as diseases. They are the cause of chokes, observed among animals weaknesses. The name of the disease is most often confused with the tick (Table I).

Most cattle diseases described above are known to losses and socioeconomic consequences they cause in the study area. In some households the survey identified 3-7 mortalities of livestock breeder. These are anthrax and symptomatic coal and pasteurellosis, trypanosomiasis, Contagious Bovine Pleuro-Pneumonia (CBPP), sore mouth (orf) and Foot

Table I: Pathology described by farmers in cattle

Some symptoms of pathological manifestations	Onset period		Suspicion	
	Local Arab	English	Local languages	English
Flickering, tearing, hair bitten, anorexia, uremia, throat swelling, weight loss	Sef	Hot dry season	**Gorane** : Djoufour; **Kanembou** : Bou **Foulani** : I am; **Arabic** : Djoufar	Trypanosomiasis
Local swelling with crackling on palpation in muscle (Member), hair bitten, prostration	chité	Cool season	**Gorane** : Darkatchok; **Arabic**: Abouwarama, Ambeidi; **Kanembou** : Bantou foutouna	Blackleg
Diarrhea, prostration, sudden death of animals in good overweight	Kharif	Season rains	**Gorane** : Dachounou; **Kanembou**: Balto **Fulani** : Balki; **Arabic** : Amdrédimé	Anthrax
Significant edema, prostration, nasal discharge	chité	Cool season	**Gorane** : Goufoudou **Kanembou** : djourdjour	Pasteurellosis
Weakness, cough, dyspnea with noise, discharge, prostration, no diarrhea	Sef	Dry season	**Gorane** : Safo / dofonagna; **Kanembou** : Foufou; **Arabic** : Amfachfache	Contagious bovine pleuropneumonia (CBPP)
Sores in the mouth, teats and hooves, salivation, loss of appetite, weight loss.	Sef	Dry season	**Gorane** : Kagna **Kanembou** : Talam **Fulani** : Mborou **Arabic** : Ablissane	Foot and mouth disease
Mouth sores, hypertrophy of lymph maxillary	chité	Cool season	**Gorane** : Bouloum	Orf
Small nodules throughout the body, blindness	Sef	Dry season	**Gorane** : fourtoum	Smallpox
Thinning hair bitten	Sef	All seasons	**Gorane** : manassou **Arabic** : amgourdam	
Prostration, deep set eyes, died after drinking	Sef	Warm season	**Gorane** : Gire **Fulani** : Dam	Heatstroke

Table II: Implementation rate sheets by Regional Delegation of Livestock

Regional delegation Livestock	Number of monitoring stations	Total pages / Month	Forecast	Achievements	Rate of achievement
Hadjer - Lamis	14	5	70	0	0.0
Lake	13	5	65	0	0.0
Kanem	14	5	70	0	0.0

Source: DSV, 2011

and Mouth Disease (FMD). They appear on the list of diseases to be monitored across the country. According to the definition of the OIE, they are subjected to mandatory reporting. But their monitoring remains very low or non-existent in the area of ACF project (Table II).

According to the annual report of the Ministry of Pastoral Development and Animal Productions, the rate of vaccination against anthrax and symptomatic coal is very low in the study area (less than 1%). According to the same source, no vaccination against the pasteurellosis has been is made in 2010 in the study area (DSV, 2011).

As for soil-borne diseases, vaccination against pleuropneumonia (CBPP) is normally imposed on all cattle on Chadian territory in its entirety, although no regulatory text is to formalize the mandatory nature of this prophylaxis. The Lake Chad region is an area of high prevalence of CBPP, and should therefore be subjected to greater vaccination effort. However, there is coverage of 2.25 Lac; 3.53% in Hadjer-Lamis; 0% at Barh El Gazal and Kanem (DSV, 2011).

Trypanosomiasis in cattle is particularly important in the Lake. Breeders of Ngouri believe that it causes more than 40% mortality. FMD and orf are of equal important. Farmers have a good knowledge of these diseases prevalent regularly in the area and are monitored. But none were found to be reporting about them. Smallpox and heatstroke generally are socioeconomic consequences.

Diseases of camels

Among the recurrent and emerging diseases in camels, there are also diseases to be monitored. Telluric diseases prominently with important socioeconomic consequences are antipasteurellique. The vaccination has not been an obligation regulated since 2001.

Some ectoparasites are also worth mentioning: the haemonchoses, intestinal worms, ticks, *Hygromas gallus,* etc. According to farmers these parasites play an important role in the impairment of the quality of meat and milk. (Table III).

Diseases of small ruminants

Diseases of small ruminants in the area identified on the list of diseases are to be monitored in Chad. It should be noted that among the diseases mentioned, plague of peste des petits (PPR) dominates in this species (Figure 1). Vaccination is not practiced for these

Figure 1 : Goat reached PPR

Table III: Pathologies identified in camels

Some symptoms of the disease outbreak	Onset period		Suspicion	
	Local Arab	English	Local languages	English
Swelling of the hind limbs (shoulders), uremia, lameness	Kharif	Rainy season	**Gorane** : Darkatchok **Arabic** : Abouwarama, ambeidir	Blackleg
Pasty diarrhea, weight loss, abortion of female	Kharif	Rainy season	**Gorane** : Cherchina Arab Somal	Haemonchosis
Tearing, hair dive, edema in the lower abdomen, emaciation, agalactia, loss of appetite, urinary retention and / or strong odor.	Sef	Dry Season	**Gorane** : Djoufour **Kanembou** : Bou **Arabic :** Djoufar	Trypanosomiasis
Swelling of the neck and mandibular lymph nodes, hair bitten, constipation, diarrhea greenish abortion	Kharif	Rainy season	**Gorane** : Djahdir **Kanembou**: ndjourndjour	Pasteurellosis
Sore on the lips, swelling of the head	Kharif	Cool and rainy season	**Gorane** : Bouloum **Arabic** : Amdedèche	Ecthyma contagious
Hair loss, itching sores on the skin, weight loss,	Sef	Dry Season	**Gorane** : tourkom **Arabic** : Djarab	Hygroma Galus
Emaciation, edema lower neck, agalactia, abortion	Sef	Hot and Dry Season	**Gorane** : Kouli **Arabic** : Dout	Intestinal worms
Thinning hair bitten	Sef	Dry Season	**Gorane** : manassou **Arabic :** amgourdam	Parasitic external
Prostration, deep set eyes, died after drinking.	Sef	Warm season	**Gorane** : Gire **Fulani** : Dam	Heatstroke

diseases. According to farmers, it causes a mortality of between 20 to 47.8% (Table IV).

By cons, vaccination against pasteurellosis is very little practiced in some regions (DSV, 2011) and also Contagious Caprine Pleuro Pneumonia (CCPP) caused by a mycoplasma is quite recurrent in the area.

Unidentified by farmers Diseases

Some farmers reported the presence of Goran oasis Yeguil I, II and Bour in the flowers of plants, Kangar (*Prosopis* sp.) at the Northern Kanem region. Consumption of these flowers causes contractions and torticollis in camels, cracking teeth in cattle and goats. In camels food bowl often remains in the mouth. Others argue that it is rather the case or give *Leptadenia* sp. jaw that causes this paralysis. Death occurs thereafter. By cons in the Lake until Ngouri consumption leaves *Leptadenia pyrotechnica* and *Prosopis* sp. Cause abortion in cows in the last trimester. That is why the animals are sent to the Lake to December to March (a form of prevention against this phenomenon, which is observed in recent five years) (Table V).

Cases of neck stiffness and torticollis, followed by death in camels were reported in the region of Bahr el Ghazal and Hadjer-Lamis, but rather in ov / cap the same symptoms have been described. The causes of these diseases are unknown.

It would be interesting to conduct a study to determine the nature of these species, consisting essentially of *Leptadenia* and *Prosopis* in Kanem and Lac. It is the same for other diseases (sorop, Cherchina daoufoudi in Goran) and those that are not known in French and Goran.

In general, all the above diseases have been well described by breeders. Periods of disease onset are also well known to breeders. This shows that farmers are familiar with these diseases, also the level of knowledge of these diseases to farmers. As for treatment, the source of disease and especially prevention (anticipation of the onset of these diseases), they are far from being known and controlled by them.

In view of the above tables and field observations, clinically diagnosed diseases are endemic and well known breeders. They are viral, bacterial and parasitic origin. According to the farmers surveyed, these diseases are recurrent and have a very important socio-economic impact (ACF, 2013).

Factors Promoting the Spread of Disease

Infectious agents of soil-borne diseases are bacteria (*Bacillus anthracis, Clostridium chauvoei* or *Clostridium septicum and Pasteurella Multocida* or *Pasteurella haemolytica*). Spores of *Bacillus* and *Clostridium* are very resistant infectious agents in nature. Some authors argue that soil bacteria can survive for years in soil and contaminate fodder and forage surfaces. Other authors report that pets harbor microorganisms, viruses, bacteria and other contaminates in the livestock grazing forage through contaminated wounds and skin lesions during seasonal variations (Emma, 1989; HCSP, 2011). Considering these observations, the ubiquity of ticks and tabanités observed in the Lake region may be vectors of pathogens that borne for diseases. Pets (cats, dogs, horses, chickens, etc.) accompanying their transhumance routes can collect bacteria, viruses and other parasites in the cursed fields and convey among transhumant animals. Inadequate health personnel can provide advice and treatment on the field; non mastery of techniques and farming practices by farmers (care, mismanagement of corpses) squeezed between other recurring causes of disease observed in the region. These observations confirm the provisions of the OIE (OIE, 2002). Moreover, during the transhumance livestock concentration from different backgrounds is observed around traditional wells. Direct contact between animals - animals is established. Which would amplify the fields of action of mechanical vectors (ticks and Tabanidae) of certain diseases, source of infection and reinfection (Ban-bo *et al*., 2012).

Corpses dumped in nature are counted in the hundreds (Figure 2 and 3). These animals died due to disease are usually not diagnosed. Some breeders say

Table IV: Pathologies identified in Small Ruminants (Ov / cap)

Some symptoms of the disease outbreak	Onset period		Suspicion	
	Local Arab	English	Local languages	English
Cough, purulent nasal discharge and watery eyes, swollen lips and edematous, profuse diarrhea or soft	chité	Dry season and fresh	**Gorane** : Ari **Kanembou** : Kourfou **Fulani** : Fufu	Plague of Small Ruminants
Cough, nasal discharge, dyspnea, no diarrhea, legs apart	chité	Dry season and fresh	**Fulani** : Karganguel	PPCC
local edema (members), diarrhea, hair bitten, prostration	chité	Dry season and fresh	**Gorane** : In in **Kanembou** : ndjourndjour	Pasteurellosis
Jitters, diarrhea, high mortality, sudden death	Kharif	Rainy season	**Gorane** : Dachounou **Kanembou** : Balto **Fulani** : Balki **Arabic** : Amdrédimé	Anthrax

that they bury the dead animal bodies which were affected by suites contagious diseases like two coals. Others believe that the corpses littering the corridors are the corpses of starved animals. In all cases, after death, the animals were buried, are burned, or left in the wild. Non-control technique for the destruction of carcasses make these places as called "cursed fields" and in turn become sources of infection. According to several authors the direct contact between healthy carriers and diseased animals, dead and / or contaminated areas are a source of infection and viral or bacterial reinfection in susceptible hosts. The virus of Newcastle disease in pigs shows the transition of the pathogen from one host to another (Moura *et al.,* 2010; Ban-bo *et al*., 2012; Yuan *et al.,* 2012), which explains in part the endemicity of coal and pasteurellosis.

Means to Fight

Care of sick animals

Since the privatization of livestock breeders and auxiliaries are not assisted as in the past, self-medication is common among farmers; auxiliary farmers turned into health workers. Products of all comers are often administered to animals for the most cases they eventually die. Lack of control over health care is a real problem that usually leads to the death of the animals. The problem of under dosing veterinary products is also recurring. Non mastery of technical care can develop resistance in animals that eventually become a source of re-infection in the herd.

Access to inputs is strongly related to veterinary facilities in the area. Aside from veterinary stations, there are no other structures, to respond and to ad hoc calls; but veterinary officials are obliged to protect some products (antibiotics and vaccines). The real problem remains the movement of the agent. Although a minimum of 1,000 animals seems to be exaggerating to move a veterinary technician over 50 km, we must recognize that no agent cannot move if it is not sure to cover its expenses. Pharmacies and drug stores are virtually nonexistent. Private veterinarians are not installed in the study area. Access to veterinary structures seems to be very difficult; access to quality products are also limited. Which promotes the proliferation of vendors and products coming in all the weekly markets and created resistance and the emergence of diseases.

Prevention

The main diseases in cattle and camels are borne diseases for which vaccines are produced at Veterinary Research Laboratory and Zootechnical Farcha: anthrax, blackleg and pasteurellosis, trypanosomiasis; peste des

Table V: Diseases identified

Some symptoms of the disease outbreak	Period	Animal species	Cases by farmers	Local name
Diarrhea with traces of blood	Dry season	Cattle	Dirty water, fed	Gorane : Cherchina
Crack teeth, contraction, torticollis, death	Warm season	Camels, Cattle, Sheep / Goats, don-keys	Kangar (Tree bafon) or *Propsopis* sp.	Gorane : Shemei / Guefiri
Maxillary swelling and paralysis	Warm season season indicate otherwise remove the line	Camels	*Leptadenia pyrotechnica*	indicate the name otherwise remove the line
Ingestion of foreign bod-ies, earth, corpses, urine	Dry season	Cattle	Mineral deficiency	Gorane : Sorop
Swelling of the head and neck, runny nose, gasp, cough	Dry Season	Small ruminants	Unknown	Gorane : Daoufoudi
Stiff neck, torticollis, death	Dry season	Camels, Sheep / Goats	Unknown	Not

petits ruminants in small ruminants. All diseases diagnosed in the area make losses and / or have significant socio-economic impact, but prevention still remains optional. But since 2001, an order is made by the authorities in charge of livestock for mandatory telluric diseases (Arrêté n° 204/ME/DG/DERA/2001 du 12/06/01). But the problem lies in the prevention and care of animals. Farmers say that they vaccinate when their observe mortalities in the other breeders; no precaution is taken before. This practice is far from limiting mortality in flocks.

For the cracking of teeth and contraction, stiff neck and abortion of pregnant animals during the period from December to March, farmers of South Kanem send animals to Lake Chad to avoid abortion and other complications that can cause the *Leptadenia* and *Prosopis*. This form of prevention against new phenomenon, which is observed for more than five years is the result of a chance; because during this period diet and water are scarce in this part of Grand Kanem.

Improvement of the Health Status of Animals in Grand Kanem

In the strategy to improve the health status in the area, we propose: awareness and training; vaccination of livestock; structuring breeders.

Awareness and Training

This is a cross-cutting activity that allows partners to agree on the action to be taken on the ground. It also helps to assess the degree course work and ownership of technologies and practices in healthy breeding behavior. The themes to be developed will include: the importance of vaccination act, how to avoid the disease; groups and their role etc. All actors will be involved in this practice Communication tools should be used to get information effectively.

Vaccination

This activity already exists but it is not prevalent on the ground. To be quite operational, it will be preceded by an awareness campaign at different levels. Telluric diseases and peste des petits ruminants will be affected by the vaccination because of the significant losses they cause. Vaccines against these diseases are accessible at any time simply because they are produced in Chad. The vaccination certificate must be accompanied vermifications by the region. In the region Bahr El Gazal and Hadjer-Lamis, pesticides will be used as anthelmintics, by cons in Kanem and Lac it will be the douvicides. Wormers are given free for the first two years. For subsequent years, farmers will support expenses related to gradually worming at 25%, 50%, 75%. In the past year, the farmer is supposed to

Figure 2: Goat thrown in nature (lake)

Figure 3: Cattle kouri badly burned (Lake)

understand the importance of vaccinating all of its livestock.

Ten control farmers in each region will be chosen to accompany the process. A protocol will be signed between the partners to better assess the results at the end of each year.

Structuring

To be effective it is necessary to have the respondents on the ground. These respondents will be of different chefs members. They are professionals responsible to communicate, educate, and inform farmers. Pastoral societies are loaded, they even set up groups of pastoral interest; unions of groups in the attachment points with the support of the project. These structures are the sponsors or representatives of the farmers forconcrètent actions on the ground. They will practice the practical management and concerted equipment (bikes, fuel), veterinarians and other work tools products (mobile phone) for better management. This will reduce the distance and the cost of providing services. A set of specifications will be developed to determine the mission of each.

CONCLUSION

The diseases mentioned by farmers in Grand Kanem are well known veterinary diseases. Most of them are on the list of diseases called "Contagious Diseases Known Legally Animal in the Territory of the Republic of Chad" because of the socio-economic consequences they entail. The endemicity of some of these diseases are due to the presence of reservoirs and contributing factors which include: (i) the permanent presence of potential disease vectors (ticks, flies, snails, etc.). (ii) inadequate pastoral wells in the area that causes a concentration of diseased animals and healthy carriers can infect animals or reinfection; (iii) the difficulty of access to products and processing for microbial load in animals; (iv) lack of qualified staff dealing promoting non-technical skills of treatment and care; (v) the low level of organization of farmers which is the main cause of lack of respondents in terms of action to be taken on the ground. Some new diseases were appeared in the recent days. According to farmers, the *Leptadenia* and *Prosopis* cause the jaw paralysis and abortion in camels and cattle. These plants have a long history and are consumed by livestock, but the manifestation of the disease in camels and cattle is recent and deserves special consideration. The organization of farmers should be studied extensively because auxiliaries usually disappear and leave farmers to their fate. It also allow the respondents on the ground to act in real time, and solve the issue of access to products. The appropriation of good practices and farming techniques is an activity that must be taught as a long term course to farmers. Awareness and training should be the basis of this activity can improve the health quality of animals in the area.

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